REPORT OF COMMITTEE

ON

SCHOOL HYGIENE IN TENNESSEE.

BY

DANIEL F. WRIGHT, M. D.,

Of Clarksville, Tennessee,

MEMBER OF STATE BOARD OF HEALTH, AND CHAIRMAN OF ITS COMMITTEE ON THE SUBJECT.

REPRINTED FROM THE SECOND REPORT OF THE STATE BOARD OF HEALTH.

(*January* 1, 1885.)

REPORT OF COMMITTEE

ON

SCHOOL HYGIENE.

For good or for evil, the constitution of most persons is determined for life by the events within the average child's school days, say between the seventh and fourteenth year of life, or, to speak physiologically, between the second teething and the age of puberty. Prior to this period, especially up to the fifth year, the child has a struggle for life or death, with maladies affecting chiefly the digestive organs; but by the time indicated, he has either succumbed to these or survived them with but little permanent effect on his constitution, unless some special impression has been made through them on his nervous system; but from this time on to that of adult life, the nervous system is that which, for good or for evil, is most liable to be affected by the events of what may be called the scholastic period of life.

I find this critical and interesting period of life to have been less thoroughly treated by systematic medical writers than any other. Text-books on the diseases of children are generally based upon observations made in child-hospitals, which are almost entirely occupied by patients under five years old, and, by these works, little has been added to our knowledge since the publication of the great classic of Barthez and Rilliet, which has been the foundation of all the pædiatric literature of more recent times, and the experience of those eminent men was acquired in the *Hopital des Enfants Trouvés*, of Paris, where the fifth year is seldom reached.

DISEASES OF THE SCHOLASTIC PERIOD.

For this reason I think it necessary to prefix to this report some observations on the morbid tendencies of the school-age. In doing so, I have to apologize to the learned and scientific gentlemen of the State Board of Health for appearing to instruct them on what they are, doubtlessly, as well, if not better informed than myself, begging them to remember that this report, while primarily addressed to them, is intended mainly to influence a class not versed in medical science, viz: Teachers, superintendents, boards of educa-

tion, and, if possible, the parents of children at school. The same consideration will account for the avoidance, so far as possible, of technical words, and the taking for granted facts which must be known to educated medical men, and have to be received without demonstration by the non-professional. This inquiry then will be specially directed to that period of life, which extends from the seventh to the fourteenth year, or thereabouts, to those disorders to which children of that age are specially liable, and to the moral and physical treatment, which is likely to aggravate or abate such liability.

I maintain then that the special tendency of the constitution, during the period in question, is to diseases of the nervous system, and that illjudged school discipline, is calculated so far to promote such disorders as frequently to impress on the constitution lesions which appear in multifarious forms in after life, and which, when they fall short of disease, leave behind them moral and intellectual infirmities, generally attributed to original defects of character, but really attributable to thoughtless mismanagement during education.

EPILEPSY.

As this is a view not often put forward, it is proper to strengthen it by established pathological facts relating to the occurrence of various diseases during the period in question, the relation in short of these diseases to the first and second teething, and to puberty. Take epilepsy for example; this disease, when it occurs in childhood at all, is observed most frequently to make its first appearance at the period of the second teething, though when it does so, it is generally found on enquiry that convulsions have attended the first teething, perhaps repeated occasionally in the interval, but renewed with characteristic force at the second dentition. Where this is the history, our best practitioners have learned to recognize in the first infantile convulsions the manifestation of the original vice in the nervous organization, which, in after life, constitutes epilepsy proper, and the interval between second teething and puberty, is watched with the gravest anxiety, for if the convulsions are repeated after the permanent teeth are fully developed, and especially if they are aggravated in intensity, and frequency at the pubescent period, confirmed epilepsy is feared as the destiny of the patient for life.

CHOREA.

Chorea is emphaticaly a disease of what we have designated as the scholastic period of life. It is true that it may occur as early as the second year, but rarely before the seventh, and as rarely does it persist beyond the period when the sexual functions are fully developed. At that period, if not followed by partial paralysis, which does not often happen, it is very liable to be replaced by hysteria in females, and rheumatism in both sexes.

ASTHMA.

Asthma in the young is a nervous disease affecting specially the pneumogastric system; *i. e.*, the nerves of the heart, lungs and stomach; it very generally terminates in full recovery at the completion of pubescence, when the last medicine given gets the credit of the cure, especially if it be a quack nostrum.

Not to prolong this list too much, it may be mentioned that the minor disorders of the nervous system, such as squinting, near-sightedness, stammering, etc., if acquired at all, are almost always established during the scholastic age; indeed it has been noticed that the last two infirmities are almost exclusively incidental to educated people, as is the first also, (squinting) when it is an acquired disease, independent of structural lesions.

SCOPE OF THIS REPORT.

Apologizing for the length of this disquisition on the neuroses of early life, I will now state my motive in treating of them at such length:

In most treatises and reports on school hygiene, the body of the statements refers to the site and dimensions of school-houses, with the provisions for heating, lighting, ventilation, etc., and the drainage and sewerage of the lots on which they are built. I am far from underrating the importance of all these things, but, important as they are, there are others of equal, if not of paramount, importance. I speak of the actual procedure in the school-room, as affecting the nervous system of children.

Surely, if the special tendency of the scholastic period of life is to nervous disorders, as I have endeavored to show, if the brain and nerves are more rapidly developed than any other organs during that period, and more susceptible to both benignant and malignant influences from external causes, the effects of school methods of teaching and discipline, of the hours of school-work, and recreation, and all matters in short affecting this delicate and complicated department of the human organization must have an importance paramount to all other considerations of school hygiene.

Sensation and motion, intellectual and emotional action are the functions of the brain and nerves, and are also the *media* through which these receive benefit or injury; and all these are specially dealt with in school life. Not that these are the only things which the nervous system has to do, or which affects its well-being. Respiration, digestion and nutrition requiring good air, good water, and good food, are all influenced by the nerves, and exercise a reciprocal influence upon them; but these latter will be treated of by themselves, and the various arrangements of school life will now be considered as influencing the former group of functions.

SCHOOL-HOURS.

The amount of bodily or mental exertion which can be endured in a day is limited at all ages, but much more so during youth than at any other period, and the earlier the stage of youth, the narrower the limit. There is a double reason for this, the brain and nerves are less developed at that age, and they have more to do; they have to promote and regulate the developments of the rest of the body, a process which, in adult life, is completed. Hence, the capacity for exertion being different at different ages, the work must be apportioned accordingly. The following estimates have been given, as to the length of time, which can healthfully be assigned *per diem* to study and recitations at different ages:

AGE IN YEARS.	HOURS FOR STUDY AND RECITATION.
Below seven,	2½ to 3.
Seven to ten,	3 to 3½.
Ten to twelve,	4
Twelve to seventeen,	5 to 6.

School directors of Tennessee will look upon this schedule with surprise, and an instinctive spirit of resistance, and, indeed, each of the items in it will require separate consideration, but before this detailed examination, we must discuss the much controverted question of *the single or double session*. It is evident that this question depends for its solution partly upon local considerations. In the country where the population is sparse, and many of the pupils travel several miles to reach the school-house, it is clear that there is no choice, the children must be taught all they can learn in a limited time and sent home. But in cities where they are all on the spot, the question requires much consideration. It is certain that the brain will bear more work without injury when the hours of study are separated by a considerable interval of recreation, than when they proceed uninterruptedly or with brief interruptions. I am satisfied that, at least in summer time, while the days are long enough, a session of three hours in the morning, and two in the afternoon, with an interval of at least two hours between the two, will produce more brain-work with less exhaustion of the brain than can be crowded without injury, into the space of a single session. I know that I shall here have the opposition of teachers, who like to get their work done as soon as possible, and to go home; I believe that even for them the longer interval of rest is better, but of this they prefer to judge for themselves. Whatever may be the case with them, however, the longer interval of rest is a very great desideratum for the half developed brains of their pupils. But this question is affected by so many local considerations in different parts of the country, that it must be left to the local school authorities; I will only say that, where it can be had, the double session is, in

my opinion, the best for the scholars, though it will always be opposed by teachers; school-boards must decide.

I will now return to the schedule given in page 6, and discuss it item by item.

To discuss the first step then, take the children under seven. As the school age in Tennessee commences at six, we cannot neglect the consideration of this class, though I consider it a misfortune that children are at school at all at such an age, the right school for them being around the mother's knee. But we have to discuss things as they are, not as we could wish them to be.

The length of time for study and recitation assigned to such children is from from two and a half to three hours a day, which, if it errs at all, does so on the side of excess. I doubt whether more than two hours can be profitably so employed at that age. A large portion of such brains is not organized as brain at all, but is merely the unformed material of brain; to require any continuous labor from such is as inhuman as was the labor required of little children in factories, until the law stepped in and peremptorily forbade it. I do not mean that the child is not to be at the school longer than that, but its school-work should be interspersed with frequent recess, and, while it is at work, as little as possible should be done at the desk, and as much as possible at the blackboard or in class. Many things can be taught even while the body is in motion. I have heard the multiplication table chanted in a simple rythm while the class marched around keeping time to the chanting, and thus converting work into play.

But not only should the interchange of work and play—brain-work and muscle-work—be frequent; even the school-work, while they are engaged in it, should be constantly varied; thus the change from arithmetic to reading, thence to writing, and especially to singing, should be frequent. The same authority from whom I have compiled the above schedule, contends that children under seven years of age should never be engaged on any one subject more than fifteen minutes at a time, and increases this time gradually with the advance in age up to that of sixteen years, when thirty minutes may be given to one subject. This is on the now well established principle that change of labor is rest. Thus a person tired of riding can yet walk a considerable distance without further fatigue and *vice versa*, and even in the intellectual labor of adult life, a person who has pursued scientific or professional studies till tired out, will find, not additional fatigue, but refreshment in turning to some pleasing departments of general literature. For the effective varying of school-work, especially that of little children, there are two exercises that cannot be overestimated; they are vocal music and calisthenics, both of which I have heard spoken of with great contempt by parents. Let such parents go into the preparatory department of a public

school when the children have been wearied with application, heads drooping, eyes dull and half-closed, limbs hanging listlessly, and let the tap of the bell summon them to their feet for a spirited song or a brisk exercise in rythmic motion, and see the change of expression as magic as that of shadows to sunshine, and I think there will be some converts to the benefit of music and calisthenics. These exercises have a value for the respiratory as well as the nervous system; they not only relieve tension of the nerves when wearied by continued and monotonous mind-work, but they cause at least double the amount of air to pass through the lungs as compared with the breathing during study.

In estimating the merits of a teacher of little children, I place before all other *criteria* the question "are the children happy under her teaching?" Children have a right to happiness, it is indispensable to them, they are not duly developed in body, mind or morals without it, and, at the age I am speaking of, it would be infinitely better for them to do without education at all than to pass a miserable childhood in attaining to it.

Having devoted so much space and time to the first years of education, I need not go into much detail in treating of the more advanced stages of it. Suffice it to say that the principles I have laid down may be gradually modified as the children grow older; the hours of study may be longer, recess less frequent, and continuous application to one study more protracted, within the limits above laid down.

But I must express my dissent from one part of the schedule, or at least from an inference to which it naturally leads.

It is the direct impression produced by that schedule that the length of study hours and the burden of intellectual labor generally may be progressively increased from the age of twelve to that of seventeen; to this I demur. I believe that a healthy boy of twelve or thirteen, and a healthy girl of eleven or twelve can stand more brain-work than the same boy at fifteen or the same girl at fourteen.

AGE OF PUBERTY.

The age of puberty requires as careful and considerate school treatment as that of early childhood, on which I have dwelt at such length. The nervous system has much to do at that period outside of school-work, and much evil arises from pushing it with extra studies. At that age a more rapid bodily development takes place than at any other subsequent to infancy, and, moreover, the sexual system hitherto dormant, comes into activity; all this occasions a vast expenditure of nerve force, and, if this be diverted from its proper office and applied to laborious and long continued study, great exhaustion results without the due fulfillment of either function. I am speaking especially of the female constitution, though

not exclusively of that; but so enormous is the evil done by exorbitant demands on the girl's mental faculties, so many are prevented from attaining a womanhood competent for its onerous duties; so many promising girls have dwindled into feeble, helpless women, incapable of either happiness or usefulness in married life, that it would be an indefensible default on my part, in the duty I have undertaken, if I were to use inadequate or even measured language on the subject; words too strong cannot be applied to it. In every school attended by girls there ought to be a prudent and experienced lady, married if possible, or one who has been married, to whom each girl, as she approaches the age of puberty, should be required to report once a month—not merely allowed but required—and it should be the duty of this lady to report to the Superintendent at every menstrual period that such girl is under the rules. Nothing but this need to be stated to any one, except to the lady in question, she is simply under the rules; and these rules should be as follows: [I quote from an excellent treatise in Buck's encyclopœdic work on Hygiene, by D. F. Lincoln, M.D.] "Each scholar on thus notifying her matron is excused from going to the blackboard to stand for work; from standing in recitations; from going up and down stairs to recite in special studies, and especially from going down stairs to work in the chemical laboratory." It is added that school-houses attended by girls should not be built of more than two stories if it can be avoided. That is well for general rules, but, in addition to this, much individual vigilance is demanded; headache, a feverish flush, a tendency to fainting, should be instantly noticed and the pupil excused from work for that day. There are writers who go so far (and I doubt whether it is too far), as to advise that every girl, at the commencement of each menstrual period, should be excused from attendance at school at all.

I am not blind to the many objections which will be raised to these proposals; objections against the resulting irregularity, and interruption of systematic instruction; objections against the door opened to malingering, for the purpose of idleness; and, finally, objections regarding the remarks which would be made by the pupils of the other sex upon these periodic exemptions. I foresee them all, and acknowledge that I am unprepared to meet and obviate them. But if they cannot be obviated, does not the whole subject suggest very serious considerations as to the expediency of mixed schools? I have no doubt of their advantage for pupils of both sexes up to twelve years of age, but I have had growing misgivings for some time as to the co-education of the sexes after this period. The physical treatment required at this critical time of life is so different that I doubt whether it can be successfully carried out with due regard to the well-being of both. I am here directly opposed to the present tendency of public opinion, but I apprehend

my duty in my present position to be that of influencing public opinion, if possible, rather than of being influenced by it.

But, though I have dwelt at such length on the care necessary for the management especially of girls at puberty, it must not be supposed that boys need no special treatment at the same age. On the contrary, they require very careful vigilance at that age, only less in degree than that demanded for the other sex. To note only the visible bodily increase, everybody knows that most boys begin to grow very rapidly at fourteen, or thereabout, and, to speak roughly, a boy who is growing at the rate of six inches a year, has as much as he can do to do that. But the visible increase in size, is a small matter compared with other changes going on in the pubescent boy; an entire new class of sensations, thoughts and emotions arise within him, and an entire new department of the human organization, the reproductive system, is developed in him. Each of these changes implies a vast expenditure of nervous force, leaving but little to spare for severe school exercises. I suppose that there is no teacher of experience who cannot mention numerous cases of boys who were good scholars up to fourteen years old, bright and industrious, becoming suddenly listless and sluggish in their exercises, even stupid, and totally destitute of energy. The average teacher who can see nothing beyond his weekly reports, now considers that he has to deal with sudden perversity, and he puts the spurs to his supposed refractory scholars; perhaps it is the rod, or he may try to shame them into emulation, by showing that younger boys are outstripping them, or, worse still, he may try to goad them with sarcastic and contemptuous taunts—and all in vain. Either the boy meets it all with stubborn resistance (which for his physique is the best thing he can do), or he is spurred into futile and painful efforts; then come headaches, or he has to go home with a low fever, and then the drains and sewers are examined for a cause, while the real evil is the injudicious forcing of a brain and nerves, inadequate for the time to the burden imposed upon them.

I admit that the teacher is here in a perplexing dilemma, continued progress is expected by the parents, but progress is refused by the scholar; or, if progress is attempted, a general breaking down is the result, and the teacher is blamed either way. The right advice to be given in such cases is not to the teacher, but to the parents. Take the boy away from school, he can do no good there; put him to some business, not too sedentary, such as book-keeping (unless he has collecting to do with it); or set him to light work on a farm, or give him any occupation in which moderate brain work is alternated with muscular exertion. Do this, and in two years, if you still desire further schooling for him, you will find he has a better appreciation of the value of it, and also mental and bodily faculties, better able to stand the labor of it.

STIMULUS.

Stimulus, in some form, is an indispensable agency in school work, and it is still a matter of controversy what form the stimulus should assume. I find myself here placed in the dilemma either of neglecting a most important element of mischief to the nervous system of the scholar, or of seeming to encroach upon the functions of the teacher, by discussing subjects belonging exclusively to his department. Being compelled to choose, I select the former horn of the dilemma, and, if teachers protest, I can only tell them that, while mind and body act and react on one another so constantly and intensely as they do, neither the teacher can safely neglect the effects of his procedure on the bodily frame, nor the hygienist the methods of discipline, which so seriously affect the nervous system of those in whose interest he writes.

Fifty years ago, neither the average teacher, nor the average scholar contemplated any other stimulus for the sluggish and the refractory than the rod. In the present day, we seem to be arriving at a nearly unanimous opinion in condemnation of it. I am not in full accord with either school, but I cannot discuss the question fully here; I am restricted to the hygienic points of view.

The methods then by which pupils are stimulated to exertion in public schools may be classed under four heads, which must be passed briefly in review, viz.: corporal punishment, keeping in, emulation or competition, and expulsion or suspension.

Concerning the last, we have nothing to say, as it removes the pupil at once from the influence of both school discipline and school hygiene; all the others must be looked upon as measures for avoiding this fatal expedient for the treatment of refractory scholars. When it does occur, I suppose all are agreed in looking upon it as a calamity visited upon the pupil, the teacher, and the school at large.

CORPORAL PUNISHMENT.

I am disposed to concede this much to the spirit of the age, that *prima facie* he is the best teacher who is able to get along with the least amount of whipping, without the sacrifice of order or progress; but, presuming that it ought always to be reserved for cases of direct defiance of school authority, I must say, that from the hygienic point of view, it is immeasurably preferable to its customary substitute, "keeping in." This latter aggravates all the evils I have hitherto specified as inherent in the public school system. Morally, intellectually, and physically, the confined pupil is under depressing circumstances; he is sulky, weary, stupefied and rebellious, for confinement does not really subdue the spirit of defiance, which intensifies under the compression it suffers. On the other hand, a smart switching gives no time for brooding; it does

not interfere with the necessary hours of exercise and recreation, which I have already claimed as inviolable on hygienic principles, and it stops rebellion at once, with all the heart-burnings attendant upon a protracted struggle of will against will; the very tingling of the cuticle sends him off to his play with a healthy stimulus. As for the chivalric bosh about degradation, I pass it over as being outside of the hygienic points of view.

EMULATION AND COMPETITION.

Setting aside, then, the method, by keeping in, as totally condemned on hygienic grounds, for both teacher and pupil, we come to the excitement of conflicting ambitions as a motive power in schools. There can be no doubt of this being a very potent stimulus, indeed, so potent as to be dangerous in some, while in others it is totally inoperative. Among the older girls, especially, the intensity of emulation often amounts to a passion, under the stress of which all sanitary precautions are swept away, not by the urgency of the teacher, but by the eagerness of the pupil. Vehement excitement, with alternate elevation and depression of spirit, exaltation and irritation, in rapid succession, are incessantly harrassing the brain and nerves with an excitement, the effects of which do not cease after school hours are over, but continue through times of recreation, and even disturb the hours of sleep. Here, I believe, is the most fertile source of nervous disorder. It specially attacks the brightest and best; it is not a defect of inferior schools, but an excess of the best, of those in which the largest amount of work and the most rapid progress is achieved.

THE SCHOOL MACHINE, WORRY.

But there is another mode of competition which affects those rather lower down in the scale, and some of them more profoundly, perhaps, than the class above described; at least a larger number are brought under its influence. I speak of the incessant push to keep scholars up with the studies of their grades which they have to do under penalty of falling to a lower grade. This peculiar stimulus takes effect upon a larger number than any other, and is in fact the chief motor-power which keeps the whole in motion. It differs from that previously described in this, that the exciting motive in the one is the hope of getting ahead, in the other the fear of falling behind—of losing grade, in short. Now, hope is an elevating agency, fear a depressing one. Here comes in that peculiar state of mind, now thoroughly recognized by nervous pathologists, called by them worry. It was first used, I believe, by Forbes Winslow, in reference to numerous cases of *dementia* occurring among business men. It was shown that, in most such cases, it was not overexertion that produced insanity, or at least not that alone, but excessive labor

under depressing circumstances—overwork, with fear and despair in the back-ground; thus, while business is prosperous, a healthy man can get through an astonishing amount of work without injury, but let the affairs become involved with daily increasing complications ominous of failure, and let the business increase its exactions on the overwrought brain, while hope gives way to foreboding, and foreboding to dread, and dread to despair—then the harrassed brain gives way under the double burden of work and despondency, and our lunatic asylums are full of *worry* so produced. *Worry* then is the prevailing trouble of large schools in which the machine is worked with vigor and energy characteristic of the modern public school system. A boy finds himself literally part of a great machine there, a single cog of a single wheel, perhaps, but the machine works on and he must work with it or be crushed by it; he feels that he must keep up with the machine and make his grade, and he feels every day less able to do so; failure implies disgrace, loss of self-respect and self-confidence, grieved and, perhaps, angry parents, the jeers of school-fellows; he redoubles his efforts and goes home with headache—ultimately sickness compels him to desist, he loses days, perhaps weeks, and finally the grade. Fortunate is he if no more permanent injury is done to a nervous system subject to such tension. Added to all these mortifications is an undefined sense of injury; he feels that he is not less intelligent than those who trample him down in the race, he can't tell why, and he is right, for it is not the stupid and naturally defective alone who fail under this trial: frequently the beaten scholar has a better mind than he who walks over him. At the risk of prolixity, I must here distinguish two types of youthful intellect not sufficiently discriminated between in school practice—they are the perceptive and reflective types. The perceptive boy catches an idea quickly, retains it well, and applies it promptly; he is bright and active in school and at play; the machine works well with him, and his advance is rapid; his teacher makes a brag scholar of him—but his is not the best mind there. The reflective boy does not take it in so quickly, from the very fact that as the seed falls in deeper soil it takes it longer to sprout: his quicker rival sees a thing at once, if he see it at all: the reflective boy has to reason it out, and this takes time; the machine cannot stop for all this; he is passed over, and, as this takes place frequently, he is gradually recognized as the stupid boy of the class. The effect on the boy himself depends upon his nervous organization; if it is sensitive and irritable, he wears himself out with futile efforts to keep up; if it is less impressible he gradually subsides with a sullen contentedness into the stupid boy's place, falling grade after grade, until his friends conclude his case to be hopeless, and put him at some work they hope he can do. But stupid boys of this sort have become some of our greatest men. Sir Isaac Newton, Sir Walter Scott, and hosts of

other men, illustrious for intellect, were recognized as stupid boys at school, and the phenomenon has been often stated and wondered at that, in so many cases, stupid school boys have become men of vast intellectual power. The solution is that, not they but their teachers were stupid in not recognizing a type of intellect which required other than machine methods for its development.

But it is not with those who have survived the blunders of their school treatment and become great men that I am now concerned; it is those who have more excitable nerves and a less stalwart frame, whose nerves have been torn to pieces by the inexorable working of the machine, and whose spirit it cowed by repeated failure, that are the victims of the machine. I am not writing from theory, but from observation. I have not only been engaged in education myself in early life, but I have been for several years a member of the Board of Education, in Clarksville, where the public schools are among the best in Tennessee, and the system of instruction includes all the modern improvements. As a part of the duties of that office, I have practiced a constant inspection of the schools while at work, and familarized myself with the methods of teaching and discipline and their results.

And what are these results? Alas! I cannot give statistics for them, for such results have never been tabulated, and cannot be tabulated; they are read in their effects in after life, producing helpless, hysterical women, and feeble, irritable men, producing neuralgia, and as their extreme results, epilepsy, insanity and idiocy. I am conscious that this will be looked upon as exaggeration, and I have no remedy for that impression, though I am certain that it is within the truth. One fact, however, I can state: In the grammar department of the schools I have mentioned, consisting of a number of scholars varying from 120 to over 200, five cases of chorea occurred during the session which closed last June; the cases yielded readily to treatment while the patients were removed from the school, but the malady always returned if they returned to their desks. Now, it will be said that five cases out of two hundred scholars is not a very serious amount of disease, but I take it as a test of the tendencies of the school system. M. Rufz, in the French dictionary of medicine, finds 189 cases of chorea out of 32,976 children admitted to the childrens' hospital of Paris; this is an average of one and one-tenth per cent. *on the whole number of sick children*, while the school in question gives an average of two and a half per cent. out of all sorts—sick and well. Granted then that our five cases out of two hundred is not a very serious matter (though the parents of these five probably think otherwise), the occurrence of these cases is a test phenomenon which makes it certain that a vast amount of nervous trouble must prevail there of a less grave and conspicuous character.

[The body of this report was necessarily written before reports could be received from other schools in Tennessee, which will account for our observations being limited to the schools of one moderate sized town. These schools are admitted, however, to be among the best regulated in the State.]

I cannot dismiss this portion of my subject without calling attention to the effects of this storm and stress in our school system upon the teachers as well as the scholars. Let it be remembered that almost all the teachers in our public schools, except the superintendents, are now females. I believe it will be found that a truly healthy person among them is the exception, rather than the rule; at least if the observation is made in June, towards the close of the session's work. Nor can it be considered an accidental coincidence that, in this State, an ex-State superintendent and the existing superintendent of the largest city schools in the State are palsied men.

I fear that boards of education limit their idea of their duty too much to the one purpose of getting the largest amount of work out of their employes at the lowest possible price. So narrow a method as this defeats its own purpose; a system which thus squanders the health and energy of teachers can never be advantageous to the pupils; the self-possession and tranquility of mind which are essential to the qualification of a good teacher are entirely incompatible with the harrassed and exhausted nervous systems which are the inevitable consequence of our machine system of education. Exhausted nerves are irritable nerves, and irritability is the worst defect a teacher can have. Let our school directors, therefore, reflect that a hard bargain with their teachers is a still harder bargain with their children.

THE REMEDY.

But readers will long ere this, have begun to propound the question what is your remedy? What do you want done? Such questions are always very difficult to answer, and in this case a complete remedy would be tantamount to a revolution in our public school system; for the errors out of which all these evils spring may be comprised under two heads:

First—Not enough teachers for the number of scholars.

Second—Too much teaching crowded into too short a time.

1. Children cannot be taught in great masses except by general rules; in other words, by machine methods. What we have been endeavoring to show is that the evils in our methods arise from a want of discrimination, what answers for a majority crushes a minority; discrimination is needed between boys and girls after a certain age, and between boys of a different mental types. But a teacher who has from fifty to seventy-five scholars to teach cannot discriminate, and, in our very best schools, many have at times more on their hands than that. One teacher to fifty-six scholars seems to

be the proportion agreed upon for public schools North and South, and I have not the least doubt that one in forty would furnish as much as one teacher could attend to with good results to both teacher and pupil. But can this be furnished? Not under existing arrangements without larger appropriations, and I have practical knowledge of the difficulty of getting city and county authorities to consent even to the existing school taxes. I fear it will be many years before an increase will obtain consideration.

I can only point out the evil, therefore; to suggest the remedy would be to overhaul the whole fabric of our existing school system, which would be out of place in the present reports.

STIMULUS OF SYMPATHY.

There is still another mode of stimulating the youthful intellect which must be dwelt on very briefly, as it is a method for Eutopia, rather than one to be hoped for in Tennessee. Once in a generation, perhaps, an educator is granted to us who is at once possessed and penetrated with the genius of teaching, and capable by the magic of his manner of communicating his enthusiasm to his pupils, a man of rare penetration into diversities of character, a man loving his scholars, and capable of exciting their love, and in these rare instances, we see in truth that,

"The labor we delight in physics pain."

But such a man combines in himself the qualities of an angel, a philosopher and a consummate statesman—a combination not often attainable at the rate of $400 a year, the average salary of teachers, as I am informed, in Tennessee; and even if the ideal teacher should be found, I fear it would require ideal pupils to be duly influenced by him.

EXERCISE—GYMNASTICS.

The average boy needs no instruction as to exercise, provided he is allowed "ample scope and verge enough." He knows the demands of his body in that respect better than anyone can tell him, and needs no incentive towards fulfilling them; so that supposing the case of a boys' school in the country with the woods near enough and a sufficiently liberal recess provided for him, he may well be left to himself uninstructed. But the average boy is not the only person to be considered, nor are the schools most in need of sanitary instruction situated in the country. What I shall have to say on this subject refers therefore to large schools in cities with pupils of all ages and of both sexes.

In most such schools unfortunately the play-gound is very small, and in some there is none at all. In the latter case the establishment ought to be condemned without compromise, unless the recess is long enough to admit of the pupils going home and returning to

an afternoon session; but this brings up again the controversy of the single or double session, which is a question that will not rest, let teachers do what they will to suppress it. There is an "irrepressible conflict" involved in it.

I take up the case then of city schools, which have some modicum of play-ground. Where sanitary principles are duly regarded, a gymnasium will be deemed an essential appendage of such schools; or rather two gymnasia, one for boys and another for girls, unless the recess for the two sexes can be arranged for different hours, and that would imply the separation of the sexes after early childhood is past, a measure I have already advocated as highly expedient. This also is opposed to the public opinion of the present day. But a gymnasium in which pupils were simply *permitted* to exercise at pleasure, would go very little way towards meeting the exigency; the pupils who need it most would never exercise at all, and those who did, would probably injure themselves by excess. A gymnasium for school purposes requires a leader of exercises, who should fulfill the functions of the old Greek gymnasiarch; he should conduct the exercises and judge what exercises are suitable and healthful for the several scholars.

All this is far in advance of the public opinion of the present; it may possibly become a feature in the public schools of the future; for the present, perhaps, military drill may be suggested as an exercise for the recess in city schools.

For the little children, a teacher, skilled in the methods of the *kindergarten* would be the best directress of the recess exercises.

INFECTIOUS DISEASES.

The laws of Tennessee already forbid the attendance of children suffering under infectious diseases at public schools; it was probably by an oversight that they failed to require vaccination as a condition of attendance in all cases where the child had not had smallpox or variola. This board would, I respectfully submit, do well to urge the addition of such a provision; many of our city schools have a municipal ordinance to that effect, and I have seen it work well beyond the limits of the school, when enforced, by calling general attention to the matter, and so bringing about general vaccination throughout a community.

But there is a class of diseases not properly speaking infectious, the spreading of which should be provided against in schools; they are not propagated by infection, but by imitation. These are the nervous affections, epilepsy, chorea and hysteria; where any one of these occurs the patient ought to be instantly removed from the sight of the other pupils, or the same disease will be very likely excited in some of them.

Stammering is a nervous disease seldom acquired elsewhere than

at school, and it is acquired there in two ways, by imitation and by impatient, irritating treatment in class. Of course, a child should not be excluded for so slight a cause as this, but the acquisition of the habit can be prevented, and the habit itself cured in its inceptive stage, by care and patience on the part of the teacher. The first time a child commences a stuttering answer in class, he should be stopped gently and kindly, told to collect his thoughts and not speak till he is quite ready with what he has to say; above all, other pupils should not be allowed to prompt or correct him until he has either succeeded or failed without interruption. After first stopping him, he should be asked whether he understands the question, and if not it should be repeated and explained, and then the pupil told to take his time about it, and, if the habit has not been fully formed, he will probably answer without a stutter. On the other hand, a little impatience on the part of the teacher on such occasions will go far to establish stammering, first as a habit, and afterwards as a disease liable to last for life.

HYGIENE OF THE SCHOOL BUILDING AND PREMISES.

The great body of reports like the present is generally occupied with the treatment of this subject. I do not follow the example. Most of the topics discussed under this head belong to general hygiene, and should be discussed in that department. Thus, much is generally said about the drainage and sewerage of school premises. On this I have only to say that the efficiency of these depends very largely upon the sewerage and drainage of the town in which the schools are placed. If the general arrangements for these purposes are bad, those of the school cannot be good. On this head, then, nothing need be said except that the privies ought to be placed at a sufficient distance from the school-house, and from the cistern or other provisions for water supply, (at least fifty feet from either) and that the surface water should be prevented from penetrating to the cellar. Of the interior of the building, something must be said in reference to ventilation and lighting; in other words, to matters affecting the respiration and visual powers of the inmates.

RESPIRATION.

It has been the custom in works on architectual hygiene to prescribe the number of cubic feet to be occupied by a given number of inmates; more recently and more philosophically it has been made the criterion that the whole mass of the air in a room occupied by many people should be capable of being frequently changed. The calculation is received that a minimum of 2,000 feet for every inmate should be entirely removed and replaced by fresh air every hour; and very complicated apparatus has been invented for the purpose of effecting this, far beyond the reach of public schools in

Tennessee. To show the impracticability of this, I have made a calculation what this would imply in a school-room under my observation. The room is 55 by 35 feet, and 14 feet high, which gives:

Cubic dimension of room	26,950
*Mass of air to be changed per hour . .	200,000

Dividing the latter number by the former, we get a quotient of between 7 and 8; in other words, the whole mass of air in the room would have to be changed between seven and eight times an hour to fulfill the above requirements. There is certainly not a building in Tennessee, for school or any other purposes, in which this could be done, and probably not many in the United States. Booth's theatre has probably effected this at an enormous expense, being considered a miracle of sanitary contrivance—a powerful steam engine is kept at work for the purpose during performances.

Instead of prescribing impracticable things, therefore, I will present some practicable suggestions for doing the best with more or less defective arrangements.

I. Let every window be constructed so that it can be opened at top as well as bottom. This, in winter time, will enable communication with the outer air without bringing a draft upon the inmates. In everyheated room, the air has an upward motion, on account of the greater rarity of hot than cold air. But,

II. This motion will not be sufficient to exchange any considerable quantity of air, unless air is admitted from below as fast as it can be removed from above. Here comes in the difficulty of avoiding injurious drafts. The desideratum is to admit air, which is warm as well as fresh. Where the room is heated with hot air from a furnace in the basement, let the furnace-room communicate freely with the external air, which will be warmed by contact with the furnace and let this warmed air be admitted to the school-room through perforated metal plates in the floor. [I take it for granted that in this case the basement will not be used as an urinarium, though I have known of such outrages.]

III. Let the room be, several times a day, emptied of pupils long enough for all the windows to be thrown open, and complete ventilation effected. I think this can be carried out with less loss of time than might be supposed. Thus, in graded schools, there is always a movement, once in a half hour, of scholars from the recitation room to the hall and *vice versa*. Now let this movement once an hour be made by a detour out of the room and round the playground two or three times, and while this is going on, let two or three pupils be detailed to open the windows at one tap of a bell, and close them at a second, say five minutes afterward, and let the

*I assume the room to be occupied by 100 pupils; unfortunately, it in fact contains nearly 200 at times.

second tap be the signal for the return of the pupils to the building, and to their several destinations. The great ingenuity of modern public school teachers could, I am quite sure, effect this without the loss of more than five minutes additional to that now consumed, and that five minutes in time would be more than compensated by the increased alacrity caused by the inhalation of that much oxygen.

Contrivances of this sort, which could be largely supplemented by the intelligence of teachers once directed to the subject, would go far to counteract very defective arrangements for ventilation in the building.

LIGHTING—EFFECTS ON VISION.

Strabismus and *myopia*, in other words, squinting and near-sightedness, are diseases very generally acquired at school; a few words, therefore, must be said as to precautionary measures against them.

Near-sightedness is acquired by too great a strain on those minute muscles which adapt the eye to different distances, as well as to those which regulate the quantity of light admitted into the interior of the organ. It is therefore promoted, by looking at objects too small, or too far off for distinct vision. Hence, the distance of the blackboard and the size of the letters written on it; the position of the book on the desk, and the quantity of light thrown upon it, have much to do with the hygiene of the eye.

The blackboard should not have a shining surface, and all writing on it should be large enough to be read without effort or straining by every member of the class. It ought to be directly in front of the pupils, and its surface kept clean, so that there may be sufficient contrast between the chalk and the board.

The desk at which the pupil studies should be inclined at such an angle that the line from his eye to the middle of his book should strike the surface of the book at right angles. Most of the desks I have examined are not, I think, sufficiently inclined for this; indeed, every peculiarity of vision requires a different angle. The ingenuity of manufacturers of school furniture would be well applied in inventing a school-desk with an adjustable top, in which the angle could be adapted to the vision of each scholar.

Light should be so supplied, as that it is diffused equally in all parts of the room, no pupil getting more or less than another, and none being exposed to the direct rays of the sun. Of course, this can be only approximately effected. It has been advised that it should come from only one side of the room, and that to the left of the pupil; but this arrangement is fatal to the equal diffusion of light; it will always cause a light side and a dark side in the school-room. The principal lights should come from the pupil's left, and, if possible, from the north, which would obviate the falling of the sunshine directly on the pupil's eyes.

Windows may admit lights in any other direction except in front of the pupil, preference being given to the west, which is behind him, and the south, which is on his right; but blinds should be carefully adjusted on that side, so as to exclude the direct rays of the sun.

The only direction from which light should always be excluded, is in front of the scholars, which, according to the above, would be cast. As there is not always a choice of directions, I would recommend as the best, when attainable, light from the left and from behind; the former from the north and the latter from the west.

A white-washed ceiling aids much in equalizing the diffusion of lights; but the walls should never be white, which is very trying to the eyes. A bluish gray, or a pale olive green, are restful colors desirable for them.

Strabismus, or squinting, is promoted by any cause which tends to exercise one eye more than the other, as receiving light from only one side, having the blackboard on one side instead of in front, both of which errors have already been pointed out; but a much more fruitful cause of it is brain exhaustion from the many forms of overexcitement treated of in the early parts of this report; such exhaustion leads to local disease in the brain, paralyzing one or more of the muscles which move the eyeball.

In concluding this report, I have only to apologize for the length of it, and to anticipate and depreciate two objections which will probably be urged against it.

It will be objected that I have treated mainly of matters which belong rather to the teacher than to the physician, and that the changes I propose are visionary, impracticable and eutopian.

In answer to the first objection, I can only maintain that whatever in our school system affects the health of the pupils, is legitimately within the scope of the present report, and cannot be neglected without rendering such a paper nugatory and valueless. It is the result of long consideration, and of the slow adoption of opinions, the reverse of others previously entertained by me. I have, ever since the war, watched with interest the establishment of the public school system in the South, and have witnessed with satisfaction its elaborate organization and its perfect adaptation of the means to the end in view. Its problem has been to educate, in a limited time, the largest possible number of children at the smallest possible expenditure, which, of course, implies the smallest possible number of teachers. What it has done in this respect, is truly wonderful; its incessant stimulation of the pupil's efforts, the marvelous smoothness in working effected by its methods of discipline at once so precise and so complicated. All this has brought the management of our first-class public schools to a perfection, which, as a machine, places them on a level with the chronometer or the steam engine; and our satisfaction with them would be complete if

the wheels and levers of that machinery were of brass and steel, but, alas, they are the brains and nerves of young children and half grown youths.

Having satisfied myself that these excessively delicate and tender organs are seriously injured in a multitude of cases, and in some, injured for life, I could not be silent. My strictures are addressed not to our inferior schools, but to those which are most perfect—most perfect, that is, as machines, to those in which the teachers are most conscientious, most energetic and accomplished. I am attacking nobody; I am attacking errors in which I have myself participated while officially associated with our public school system, the mischief of which I have myself been slow to perceive.

The other objection is not so easily answered. To detect error must always be a simpler process than to devise remedies for it: but the first process must necessarily precede. The evil once recognized and public attention secured, more than one mind will be called to the solution of the many difficult problems mooted, and public opinion, powerful as it is, is a machinery which it takes time as well as talent to set in motion. I am not so vain as to suppose that anything in this report will attract attention over more than a very limited area, but even that may be a beginning and may enlist other minds than mine in the effort to cure the evils pointed out.

I will, therefore, conclude, here with recapitulating the leading reforms which I consider should be aimed at.

First: To separate the treatment of very young children entirely from the general system, assigning them to ladies who combine the qualities of a tender mother with those of an enlightened teacher.

Second: To increase the number of teachers in proportion to that of pupils, so as to render some discrimination possible, some attention to diversity of character.

Third: To lengthen the recess and provide opportunity for systematic bodily exercise.

Fourth: To separate the sexes after the age of thirteen.

Postscript.—Since drawing up the above report, I have learned that Dr. Crichton Browne has made an official statement on the sanitary condition of fourteen government schools in London, in which the main point dwelt upon is *overpressure* in elementary schools. I have not been able to obtain a copy of this report, and can only judge of its purport by some extracts from it in the New York *Nation* of October 2d. Judging from these extracts, I am satisfied that the chief positions taken in the reports are identical with those I have endeavored to establish in this paper.

Dr. Crichton Browne states as his starting point, the large increase in the number of suicides in England, showing that, within the present century, their percentage of the whole population has quintupled, and that a very considerable item in this increasement is referable to juvenile suicides, including those under 16 years of age. He also cites the statistics of insanity, showing that 43,346 patients have, in twenty years, been added to the number of registered lunatics within the last twenty years, which is just the length of time since public education became general in England.

This portentous array of facts he accounts for by what he observed in the schools above mentioned. The following may be taken as a sample of these observations:

"It is now certain that more than one-third of the children attending elementary schools in London suffer from habitual headache. I have examined 6,580 children in elementary schools in London on the subject of headaches, and have found that 3,034 or 46.1 per cent. profess to suffer from them habitually. Great pains were taken to secure accurate returns. In one school containing 381 boys, 129 were sleep-talkers and 28 sleep-walkers, this being a school in which home lessons were insisted upon. In a school of 432 girls, there were 17 somnambulists, and in another of 382, there were 20. Tabulated statistics show, futhermore, that 53.4 per cent. of the boys, and 55 per cent. of the girls, suffer from neuralgia and toothache; and short-sightedness increases so rapidly that it threatens to become a national infirmity, as in Germany. A remarkable contras to this state of affairs is offered in the schools of Scotland. Only 23 children (9 boys and 14 girls) out of 335 complained of headaches, which gives a percentage of 6.5 against 46.1 for London. One child, a nervous girl, out of the 335, complained of sleeplessness, and there was just one instance of short-sightedness, while not a somnambulist was to be found; the reason being that they are well fed on porridge and milk as the staple articles of diet, with broth, potatoes, butter, tea, and occasionally a bit of meat or bacon. They are warmly clad, and wear stout clogs in winter and go barefooted in summer. They are much in the open and uncontaminated air."

It ought to be stated, however, that in London starvation is specified as one of the conditions which render this overpressure fatal: in fact he enumerated three types of children who cannot bear it, the dull, the starved, and the delicate.

Happily starvation is not an appreciable element of mischief in Tennessee, and dullness is the exception, but delicacy of constitution is much more prevalent among our children than it is further north, especially among children of intellectual tastes and sensitive temperaments.

The Doctor further deprecates the practice of giving young children lessons to learn at home, as inimical to sound sleep, and pro-

ductive of the somnambulism and sleep-talking spoken of in the extract cited.

In reference to the constant occurrence of headache, I can say that I observed the same thing in the Clarksville schools, and especially, that the cases of chorea were always preceded by frequent recurring headache.

As to the increasing prevalence of insanity, very little need be said. No physician, versed in nervous pathology, will hesitate to say that a school system which is abundantly productive of headache, sleeplessness, sleep-walking, sleep-talking, chorea, squinting, and short-sightedness, will be fruitful in insanity in after life. In Tennessee, I am firmly convinced that we are already reaping this deadly harvest—our overcrowded asylum still insufficient to receive anywhere near the number of our lunatics, while hundreds of them, for lack of accommodation, are imprisoned in county jails—these things are more impressive, when barely stated, than any comments of mine could make them.

But I must make room for one more citation to them showing that, like myself, the author quoted does justice to teachers, and saddles the responsibility on those who exact this pressure of them.

"In one school containing 448 boys, 9 only were to be withheld from examination, whereas, the doctor easily pointed out 35 in regard to whom the teacher readily agreed that, were it not for fear of the inspectors, they would be classed as quite unfit for hard mental labor; and in the girls' school there were 46 such cases among 341 pupils. A medical report is recommended as of use in such cases, and, better still, a log-book containing a register of the height weight, head and chest girth of the children."

I am thankful to find my own crude observations confirmed by those of so high an authority.

APPENDIX.

REPORT OF A SANITARY INSPECTION OF THE PUBLIC SCHOOLS IN THE PRINCIPAL CITIES IN TENNESSEE.

It would be a reasonable expectation that a State report on school hygiene should contain some statistical information on the existing sanitary condition of public schools in Tennessee. I have done my best to satisfy this expectation, and now present the results of my efforts, so far as I consider them successful in obtaining facts which can be relied upon. To publish any other, in the form of statistical statements, would be an obstacle rather than an aid to sanitary knowledge.

My first step in this direction, was to draw up a series of questions relating to plain methods of school hygiene, which I submitted to the Hon. Thos. H. Paine, State Superintendent of Public Instruction, requesting that, should they meet his approval, he would use the machinery of his board for their circulation. That gentleman responded promptly and zealously to my request, but the form of my questions had to be materially altered. I had drawn them up as put to individual teachers, whereas, the circulars were to be addressed to Superintendents of counties, who answered each for a large number of schools, sometimes as many as nearly two hundred. The change thus necessitated in the nature and form of my queries may be inferred from a few examples: thus I had inquired the number of rooms in the school building, the number of windows in each, and the direction in which they received the light, the site, whether on high grounds, the nature of the drainage, etc. These questions had now to be put as follows:

"State the number of school buildings with high grounds; number with low grounds; number well drained; number badly drained; number of one-room school buildings; number of two-room buildings; number with more than two rooms; number with sufficient arrangements for lighting; average number of windows in each," etc., etc.

I need add no more; it is evident that information based upon

such wholesale questions must be very indefinite in its character. But I have evidence which satisfies me that it is not only indefinite, but unreliable. At the time these questions were circulated, most of the superintendents had prepared their reports, and whatever inspections of schools had been made, and whatever interrogations had been put to teachers, all was done and over, and the inspections which had been made, and the interrogations put, had been without reference to our sanitary questions, or to any sanitary questions whatever. Responses, therefore, to our questions had been made without the attention having been previously directed to the subject matter of them; of course, responses so made must be very vague.

But the replies to these queries show on their surface that they are unreliable, and in some of them, the very reason is given for their imperfection, which I have above suggested. Thus, one superintendent subjoins frankly to his reply, this remark: "In visiting the schools, last summer, I did not know that this report would be required, hence, it is made from the best information I have at hand.

One gentleman says: "Many questions cannot be answered, being adapted to city schools." And one who answers no questions, says, bluntly and honestly: "I am not in possession of the information sought."

I will go no further. If I were to offer the results of these queries to the board, as statistics, I should be deceiving them and the public, and adding to the existing resources of hygienic science nothing but probable materials of error.

The only conclusion to this part of my inquiry is that, without defect of duty on the part of teachers, county superintendents or the State Superintendent, the machinery for producing reliable sanitary statistics of our county schools does not exist.

With regard to city schools, these are generally under the control of special superintendents, who have them always under their supervision, and who are well acquainted with the condition of each school. From these city superintendents I have received reports somewhat more satisfactory, but the questions were too general, as addressed to them, and, perhaps, my questions, as originally framed, would have been more appropriate, as tending to procure statistics of individual schools.

In view, therefore, of these failures to procure the information so much needed, I suggested to the board, at its October meeting, a personal inspection of the schools in our principal cities, in response to which I was commissioned to visit the public schools in Knoxville, Chattanooga, Nashville, Clarksville, Jackson and Memphis, and report upon their sanitary condition. The result of this investigation I now lay before the board.

KNOXVILLE.

VISITED OCTOBER 24, 1884.

Reported at once to Supt. C. H. Collier, who aided me with both zeal and courtesy in my visit to all the public schools in the city, numbering in all eleven buildings.

Knoxville is a site very favorable to natural drainage, being a rolling valley, between two high ridges, with drainage to the Tennessee river; consequently but little criticism is needed on that head, except in one instance, which was unfortunately the first presented to me.

THE BELL HOUSE.

I hope this is the worst school building in the State, from the sanitary point of view; it is certainly the worst I saw in East and Middle Tennessee. It is an abandoned third-class hotel building of three stories, divided on the ground and upper floors into three rooms each, and on the middle floor into five. On this floor I measured the largest room and found it eighteen by twenty-one feet, the rest being about the dimensions of the average hotel bedroom. The windows are far too few, and badly placed for light and ventilation, no other provision for ventilation being possible; the windows are not even constructed so as to open at the top.

The play-grounds are quite small, and the drainage is from the back towards the house. The privy vaults are on a rising ground, very little distant from the building, and the bottom of the vault is probably on a higher level than the ground floor of the building. In no one of the requirements of sound hygiene does this building merit anything but unqualified condemnation, which is the more remarkable, as, with one exception, the schools in this city are far above the average degree of sanitary merit.

In this building were crowded, the preceding month, an average attendance of 534 children and 12 teachers. The sexes are taught together in the first and second grades, and in the ninth and tenth; in the intermediate grades they are separated. For reasons, assigned in the body of this report, I believe the separation would be made more advisable in the highest. But the difficulty in this arises from the very small number of male pupils who attend the high school classes, and the impossibility of providing instruction for so small a number.

I will return to the subject of the Bell House, when I give a general statement regarding the schools at Knoxville.

GIRLS' HIGH SCHOOL.

The site of this school is eminently favorable to sanitary arrangements, provided due advantage were taken of it. Nor is the building altogether objectionable for a school of half the number of pupils. But it was originally built for a moderate sized village school, and is now occupied by numbers largely disproportioned to its capacity. At my request, the superintendent had the rooms on the first floor measured, and favored me with a statement of their dimensions, and the number of pupils accommodated by each. In the body of the building there are two rooms, each twenty-eight by twenty feet. These serve for study-hall and recitation-room for forty-seven pupils; in the wings are two rooms, each twenty-two by twenty feet, one occupied by thirty-four pupils, and the other by forty-two. These latter rooms should not be continued in use for a day. They are not only overcrowded, but, being built with their floor close to the ground, which is evidently badly drained, are damp and unhealthy in every way; the very odor, on entrance, is sufficient to condemn them.

Such a site certainly ought to be occupied by a creditable building. It is a rising ground, overlooking Main street, and forming part of the ridge, which rises higher, until it becomes continuous with ths lofty hill on which the University of Tennessee is built. There is plenty of room there for a really sanitary building of the first-class.

BROAD-STREET SCHOOL.

Rather a low situation, but drainage sufficient. The building is an old church, which has been divided longitudinally with two long, narrow rooms, each forty by thirteen feet. The ventilation by the windows is sufficient, and the light well distributed. The play-grounds are very small, being mere passages leading to the back of the lot. The privy vaults are too near the building, but on lower ground, which partly obviates the objection. The children attending this school are all of the preparatory classes, and attend only two and half hours a day, one division being received in the morning, the other in the evening. This arrangement obviates in some degree the objection to the insufficiency of the play-grounds.

MECHANICSVILLE HOUSE.

This building, well situated for air and drainage, comprises two floors, each containing three rooms, of the following dimensions: One room 30x20 feet, attended by twenty-five to sixty pupils; two rooms, each 27x24 feet, attended by forty pupils each; play-grounds sufficient and all other arrangements unobjectionable.

FAIR VIEW SCHOOL—COLORED.

This is a negro church building, rented to the city at a nominal rent, as a school-house on the mornings of week days, but occupied

at night and on Sundays for church purposes and various assemblies. It is situated in an open part of town, nearly in the country, in fact, and the sanitary condition is generally good.

There are two rooms, one 45x25 feet, used as a study hall, and the other, 25x15 feet, a recitation room. The number of scholars is about sixty, and all the arrangements highly creditable to the colored people who manage the school.

PEABODY SCHOOL.

Almost entirely occupied by boys; site, high and dry; general arrangement good; two floors with two rooms on each; each room 32x21 feet. The boys are healthy, noisy, and a little unruly in play time, as the teachers tell me, and as I had the opportunity of seeing, and was glad to see. On the whole, this was the healthiest school inspected in Knoxville.

HAMPDEN-SIDNEY SCHOOL—FOR GIRLS ONLY.

A three-story building, with two rooms on each floor, each 37½x21 and about 12 feet high; construction in all respects good. Each room has windows on three sides, and with proper management of the blinds, plenty of light can be admitted without injury to the eyes of pupils; but while I was there an afternoon sun was shining full in the faces of several rows of pupils through the west windows, evidently to the injury of their eyes. I called the attention of the superintendent and teachers to the fact, who assured me that proper blinds would be put up immediately. In all other respects this is a very desirable school building.

AUSTIN SCHOOL—COLORED.

One of the finest school buildings in Tennessee. It was the gift of a charitable lady, who settled in Knoxville soon after the war, and who devoted herself to the bodily and mental improvement of the African race there.

All the appliances for teaching and every provision for the health and comfort of the pupils is handsomely provided for.

There are three large rooms on each of two floors, and although the provision was at first ample for the numbers then, with the increase of population, they seem to have already overflowed their limits, and a small frame building of rather flimsy construction has been added in the rear.

I cannot close this account of the Knoxville schools without a few general remarks. The people of this city are evidently alive to the importance of general education for all classes, and have provided liberally the means of effecting it; but nothing could have been stated to demonstrate so plainly the difficulty of calling attention to public hygiene, as the sanitary heresies described in the case of the Bell House and the girls' high school on Main street. The

excuse for them is that they are the older buildings, and are situated in the older parts of the city; the newer school buildings are, for the most part, creditable to the community in which they have been built. I am satisfied that, if some of the citizens would visit successively the old and the new buildings, the very aspect of the children would convince them that there is something wrong in the former; for it is visibly affecting the health of its inmates. Let any one compare the sallow, languid faces and sluggish frames of the children in the Bell House with the sturdy bright-eyed boys of the Peabody House, or the healthy negroes of the Austin House, and a demonstration stronger than any in sanitary science will be before them.

I was credibly informed, when at Knoxville, that the Bell House was abandoned as a hotel, on account of its patrons finding it so unhealthy. Moreover, two of the best citizens told me that they were intimate friends of Prof. J. H. Pittner, who died of malarial fever while principal of the schools in that building, and they agree in attributing his death to its malignant influences.

It cannot be selfish indifference in the citizens which prolongs the existence of such an anomaly, for it is their own children who suffer, and they certainly love them better than a philanthropic stranger can love the negroes for whom the Austin House was built; it can only therefore be the habitual disregard of sanitary considerations, which has exerted so baleful an influence upon the health of our cities; only let public attention be peremptorily demanded to the evils affecting the health of the Bell House, and I cannot doubt that it will soon be improved from off the face of the earth.

CHATTANOOGA.

VISITED OCTOBER 22, 1884.

Through being a comparatively new town, Chattanooga possesses the advantage of not having any old buildings on objectionable sites, and of obsolete structures to convert into schools; the buildings she has are built for school purposes, and more or less in the light of modern experience. Like all our growing cities, however, the increasing population continually outstrips the school accommodation provided for it. The varied surface furnishes a choice of eligible sites with good facilities for drainage, and of these advantages the building committees have generally availed themselves.

FIRST DISTRICT OR HILL BUILDING.

This building consists of six study halls and four recitation rooms. Two of the study halls on each floor are thirty by twenty-four feet, and one forty-five by twenty-one feet. The two smaller ones are not well lighted, and some of the rooms are over crowded; ventilation flues connected with the stoves in such a way as to secure circulation of air. The play-grounds are large, site good, privies on the dry box system.

HOWARD BUILDING ON GILMORE STREET—COLORED.

The buildings for colored schools in Chattanooga are all called Howard schools, in honor, I presume, of some philanthropist who has interested himself in the education of colored children. This is an excellent building of two stories, and a basement with four study halls, and two recitation rooms on each story. The dimensions of the study halls are thirty-six by forty-two feet, of the recitation rooms eighteen by thirteen feet. There are ventilation flues in each room communicating with the exterior, and with apertures near the stoves so as to heat fresh air as it is admitted. The windows are well placed so as to admit light for the side and rear of the scholars. The attendance averages eighty to each of these study halls. There are two rooms in the basement besides those above described. The latrines are well constructed vaults. As in Knoxville, the colored people seem to be better cared for in regard to schools than the whites.

HIGH SCHOOL AND SECOND DISTRICT.

This is a large three-story building, containing fourteen rooms, occupied by eleven teachers. The rooms are well lighted, the windows being judiciously placed; they are heated by stoves, a method not so objectionable in narrow rooms, as in those which are broad as well as long; their dimensions are one long room forty-five by twenty-four; two smaller ones thirty-four by twenty-two. This arrangement being repeated on each floor. Besides these, there are on each floor two recitation rooms, each twelve by twenty-one feet. The radical defect of this building is the absence of play-grounds. It is not merely that the lot admits of only a passage on each side to the rear, but even this is not enclosed, and, during recess, the children take their amusement in the open street, a practice conducive neither to moral nor physical health; and the defect is the more objectionable as the high school is included in the building, which consists principally of girls approaching womanhood.

THIRD DISTRICT SCHOOLS.

This is a large two-story frame building of very simple structure, and, perhaps, the healthier for its simplicity. On each story a

broad passage runs through the whole building longitudinally on each side of which are two large school-rooms, making eight in all. Eight grades are here taught.

The rooms are heated with stoves. The play-grounds are the largest I have seen attached to city school-houses, and on the whole it is one of the most creditable establishments I have seen in this city from a sanitary point of view, with one drawback however—the privies are too small for either health or decency.

HOWARD SCHOOL ON NINTH STREET.

This building has only recently become the property of the city, and alterations and additions are in progress, adapting it for school purposes. I am unable, therefore, to express an opinion upon its sanitary merits.

Knoxville and Chattanooga run a close parallel in regard to their schools, thus:

	NO. TEACHERS.	NO. PUPILS.	AVERAGE NO. PUPILS TO EACH TEACHER.
Knoxville.....	48	2,243	46.73, very nearly.
Chattanooga.....	43	2,294	53.35, very nearly.

Thus, Knoxville has the advantage in the supply of teachers, which is a very important element of health for both teacher and scholar. On the other hand, Chattanooga has no buildings as bad as the Bell House and Girls' High School of Knoxville, nor as good as the Austin House, the Peabody, and the Hampden-Sidney in the same city.

NASHVILLE.

VISITED OCTOBER 28, 1884.

Nashville labors under some sanitary disadvantages, which she is, at this time, endeavoring to rectify, and in which her public schools necessarily participate in some degree. Her water supply is derived from the Cumberland river, at a point beyond which her city population has now advanced, and at which, therefore, the surface drainage of a city population is received into its stream. The sewerage system moreover is very incomplete. The rock in most points of

the city approaches the surface so closely as to render the construction of sewers possible only by a very expensive process of blasting. So far, however, as these disadvantages can be obviated in separate buildings, pains has generally been taken to do so.

FOGG AND HUME SCHOOL BUILDINGS.

As these two buildings are both on one lot, they have partly to be considered together. The lot admits of so small a space for play-grounds that there is virtually none at all; the privies are good and arranged with water connection with the public sewers. All these arrangements are, in common, for the two schools. The Fogg building was built as a high school, but only its two upper floors are used for this purpose; its lower floor is practically part of the Hume building. To consider these buildings separately, I commence with the

FOGG HIGH SCHOOL.

This is a three-story building, on each of the upper floors of which there is a large study hall forty-one by sixty feet, with a projection on its east side three by nineteen feet. This occupies somewhat more than the eastern half of the area, while its western portion is divided into three recitation rooms, two of which are thirty feet by nineteen feet four inches, and a third forty feet four inches by nineteen feet. The ground floor has precisely the same arrangement, with the exception that from the study hall a portion about thirty by twenty feet has been cut off for the principal's office. The study halls are lighted by seven windows on the east side, with two others on the eastern extremities of the north and south walls respectively. This distribution of windows gives an excess of light on the eastern side, and not enough on the western side, which is adjacent to the recitation rooms. The two smaller recitation rooms are well lighted, but the large one between these, being a long, narrow room, having its windows at one end, the disposition is favorable neither for light nor for ventilation.

I have dwelt more in detail upon the plan of this building than on that of others, because it gives me the opportunity of laying down a principle. A long room can only be efficiently lighted from one side when it is twenty-five feet wide or less; if wider the inequality of illumination is liable to result in myopia, stratismus or amaurosis. Still less can a long room be well lighted from one end; and where, as in almost all our school buildings, ventilation depends mainly upon the windows, the objection to this arrangement is more than redoubled.

I will here also say what needs remark as to the smallness of the play-grounds. On this head I have urged the question but little in the case of the schools hitherto inspected, viz.: Those of Knoxville and Chattanooga, because in those cities a dinner recess is given

of an hour in the former city, and an hour and a half in the latter. Where this is done, the play-ground is a much less urgent matter than where, as in Nashville, the five hours are taken at a stretch, with a recess of not more than half an hour, and sometimes less. In this case, it is a very serious matter to have a play-ground in which nothing like exercise can be obtained, nor any recreation better than lounging or loafing. Under these circumstances the reces amounts to little more than exposure to the cold in winter, and to the broiling sun in summer.

Of the Hume building less need be said, for standing as it does in the same lot, all the outdoor accessories may be considered as sufficiently dwelt upon. The building itself is constructed on a plan more favorable to sound hygiene than the other. It also is a three-story building, the height of the stories from the ground upwards being respectively thirteen feet two inches, thirteen feet eight inches, and thirteen feet ten inches. There is a passage running through each story about ten or twelve feet wide, (a very desirable arrangement) and on the upper floor there is on each side of this passage, a large room thirty by fifty-one feet, and on the two lower, a similar arrangement except that the large rooms are divided by a portition into two rooms of thirty by twenty-five feet each, making four smaller rooms instead of two large ones. There is also a partition in the middle of the passage on each floor, the abolition of which has already been recommended. [See the report of Dr. J. Berrien Lindsley on the mental and physical hygiene of the public schools, included in the third report of the Nashville City Board of Health.] I would extend the recommendation to a removal of the partition dividing the rooms on the first and second floors, reducing the number of rooms from four on a floor to two, but doubling their size; and I am glad to find that Prof. Brown, the principal of the building, concurs with me in this opinion.

THE HINES SCHOOL.

This is a large edifice, consisting of a center building and two wings, the former three stories high, the latter two stories high. Of these, the ground floor and second floor are thirteen feet ten inches high, and the third story twelve feet seven inches. The center building is mainly occupied by a large study hall, fifty feet six inches by twenty-seven feet ten inches. On each side of this is placed an entrance hall and staircase eleven feet seven inches wide, which prevents it from receiving light, except from its two ends, which is the worst disposition of windows that can be made. On the ground floor this study hall is diminished in length by a recitation room cut off from one end fifteen feet nine inches wide.

On the outer side of the entrance hall above mentioned are the two wings, each occupied by a study hall thirty-two feet six inches

by twenty-seven feet, much better constructed for both light and ventilation, as being open on three sides.

The play grounds are too small to be taken into account at all. The privies have water connection with the city sewers, and are satisfactorily kept.

The ground floor is occupied by the first and second grades (preparatory) to the number of about 280, of whom, however, only one-half are received at a time; one division staying until 11:30 A. M., and the other coming at that time, are dismissed at 2:30 P. M. The second and third floors are occupied by the other grades up to the eighth, to the number of 160 on the second floor, and 52 on the third. This is a less number for the space occupied than in most of the schools, but too many even at that.

HOWARD SCHOOL.

This is a very fine building, the plan of which is in some respects peculiar. It consists of three stories, the heights of which, from the ground upward, are fifteen feet nine inches, fifteen feet ten inches, and seventeen feet eight inches, respectively. The peculiarity is, that a large study hall, seventy-two feet six inches by fifty-four feet, occupies the center of each story, from the corners of which the recitation rooms and staircases project, laterally, forward and backward, leaving a considerable space of each wall of the main building clear for windows. This enables the room to receive light from all four points of the compass. This architectual arrangement is unexceptionable, but for one drawback, the recitation rooms are much too small. There are eight of them on each floor, varying in dimensions from fifteen feet ten inches by fourteen feet, to thirty-five feet four inches by fourteen feet ten inches. There is only one of this latter size on each floor, but there might be others of the same size procured by throwing two into one. In this way there might very easily be made three large ones and three small ones on each floor, or even four large ones and one small.

I should think that this arrangement would secure sanitary advantages more than compensating for the diminished number of rooms. Six good sized rooms on a floor would surely be enough for all necessary purposes.

STOVES.

It is here that I think it best to protest against the stove abomination, because it is here that the evils of it are most conspicuously manifested on account of the great size of the room. Let it be said at once, that large rooms cannot be heated satisfactorily with stoves, when the occupants are so numerous as to be distributed over every part of them. It was a cold day when I visited the Howard School; the room was heated with four stoves, one at each corner, and they had to be kept at a red heat in order to warm the room sufficiently;

the result was, that the children seated at those corners were in actual pain, through the heat of the incandescent iron, while the parts of the room more distant were hardly up to the desired temperature. It is time that school-building committees and boards of education should know that stoves are an exploded nuisance. Men have found this out in regard to churches which they only frequent once a week, in regard to public halls and theatres which they visit, perhaps, once in several weeks, but in the school buildings, in which their children are confined for five hours on five days in every week, they still tolerate the barbarism of close stoves, with all their noxious exhalations, with the obstacles they present to effective ventilation, and with the effect of roasting in one part of the room and freezing in another. Buildings like the Howard, and several others in our cities, can only be effectively warmed by furnaces from below, with apparatus for the equable distribution of heat in every room, and concomitant apparatus for the distribution of fresh air, warmed in its passage to the school-rooms. How this is done it is not for me to point out; there are now many ways of doing it, and the only rational course is consultation with a competent sanitary engineer.

The Howard School is far from being the only building liable to these strictures; they are applicable to all school buildings, and are only introduced here, because, on account of the great dimensions of the study halls, the evil is there most severely felt. The strictures are more or less applicable to all large school buildings.

I regret to add that the privies of this school are far from being in a satisfactory condition. The sewerage apparatus of the city does not extend to this part of town, and privy vaults are used. Whether these are not deep enough, or not cleansed often enough, I have no means of knowing; but, in either case, the arrangements are not nearly extensive enough for the numbers attending the school, which, the month before my visit, averaged 1,100.

BELLEVUE SCHOOL—COLORED.

I shall not give any details of this school as to building accessories or management. The choice of the site was so completely fatal to any possible sanitation, as to make all other provisions for hygiene necessarily futile. It is situated in the low lying district of the town, which has always been the home of malignant endemic influences, and the chosen resort of destructive epidemics. But, in addition to this, the lot, including the privies, is frequently overflowed, and, in the last great freshet, the ground floor if the building itself was six feet under water. No more need be said; no building on such a site can be made even defensible as an establishment for education.

NINTH WARD SCHOOL.

It was a very agreeable surprise, after going through a neighborhood of rather forbidding aspect to get to it, to find so admirable a

building as the Ninth Ward School, and one so well managed. The general plan of this building is similar to that of the Howard School, but with a difference which I think is in favor of the present building. The principal room on each floor is a large study hall, sixty feet by thirty-seven and a half feet, with the corners, however, cut off, so as to give the room the form of an elongated octagon; from these truncated corners extend four annexes, two of which, on each floor, are occupied as recitation rooms, and two others contain the staircases; there are two stories, with a good, dry basement under them. The play-grounds are large, and room is made for a pretty flower garden, for the most part tended by the pupils.

There is no public sewerage near, but the privies are kept clear by a water supply empting into a cess-pool at a considerable distance from the building.

Altogether, the Ninth Ward School is the most satisfactory I saw in Nashville.

TRIMBLE SCHOOL.

A distant outpost of the city, built for a country school when this portion of the city was a country neighborhood; it is small compared with the other establishments, its seating capacity up stairs being ninety-eight, and down stairs ninety-six. In the lower story the first and second grades are taught in separate divisions, one in the morning, the other in the evening, so that the whole number taught there is 192, bringing up the total attendance to 290 for the whole building—more than this are not allowed to attend—but any surplus of pupils in the district are sent to the Howard School.

This establishment retains some of the advantages of a country school, especially in the size of the lot; but much of this advantage is lost by the reservation of the large front-yard for ornamental purposes, whereas, it would be of inestimable value for a play-ground. The principal halls are twenty-eight feet two inches by forty-four feet, with a recitation room to each of twenty-eight feet two inches by eight feet.

[In the description of the Nashville school buildings, I have, so far, had the advantage of the architectural survey of them made by Mr. Wm. C. Smith, architect, for the Third Report of the Nashville Board of Health, published December 31, 1878. In respect to the remaining schools, which, having been since constructed, or for other reasons have been excluded from that survey, I have either omitted the dimensions of rooms or made a rough estimate of them by stepping.]

MEIGS SCHOOL—COLORED.

In South Nashville, a creditable building of two stories, containing one large study hall and four recitation rooms on each floor. The play-grounds are good; the privies are vaults about eight feet

deep, apparently well kept. The pupils here taught are from the first to the sixth grade inclusive, of whom the fifth and sixth are taught in the upper story, the rest on the ground floor. Average attendance, upper story, 50; lower story, 300, of whom only one-half attend at a time.

PEARL SCHOOL—COLORED.

A very good building of two stories, with a good basement, attended by nine grades. There are large halls on each floor, about sixty-three by forty-four feet, of good height, with six recitation rooms. The first, second and third grades are taught on the ground floor, the rest in the upper story. The arrangements of the windows for distribution of light are good, and, also, for ventilation, so far as that can be effected by windows. The privy vaults are ten feet deep, with drainage from the school.

I have now to omit two not very important schools in the extreme western suburbs of the city, having lost my notes relating to them. They are in a newly built-up part of the city, sparsely inhabited at present, and will doubtlessly be improved as population increases around them. They are the McKee School, colored, and the Tarbox School, white.

Crossing the Cumberland, we now arrive at East Nashville, formerly a separate corporation under the name of Edgefield.

MAIN STREET SCHOOL.

This is a large building of three stories, occupied by 725 pupils, and fourteen teachers. The ground floor and upper story are divided into four rooms each, the largest of which is about fifty feet by thirty feet. The middle floor is less divided, consisting of one large study room, with four recitation rooms.

The higher grades occupy the ground floors, the little children the middle floor, and the intermediate classes the upper story. This is the only school in the State in which such an arrangement of classes is made, and I wish to speak of it with special approbation. For reasons specified in the body of this report, it has been contended by the best hygienic authorities, that it is a very objectionable practice for girls approaching puberty to pass up and down two high staircases several times a day. In many of the schools which I have visited, I have accordingly suggested an arrangement like the present, and been uniformly answered that it would entail great difficulties in the way of discipline and the movement of classes. In answer to this, I can only say that here is a good school in which the arrangement is in practical operation on a large scale, with excellent effect, and with no trouble as to discipline or movement. I saw the classes changed from room to room, and the children dismissed for recess, and reassembled without the slightest disorder. What may be the difficulties anticipated, as inseparable from this arrangement,

I have never had clearly explained to me by those who make the objection. I must add that Dr. A. J. Cavert, who is principal of this building and deputy superintendent for the schools on this side, manifested an exceptionally intelligent appreciation of sanitary provisions.

One excellent feature in this building I was near omitting, which is, that while stoves are here, as everywhere else, used for warming the rooms, the office and passages are heated by a furnace in the basement. This arrangement obviates some of the most important objections to stoves, as it enables the rooms to be kept sufficiently warm without heating the stoves red hot.

On the whole, this Main Street School impressed me as standing high above the average in a sanitary point of view.

MEIGS SCHOOL—COLORED.

A handsome two-story brick building, recently erected. One large study hall and four recitation rooms on each floor. The lower story is occupied by the first four grades; the upper one by the fifth and sixth. There are 300 children taught on the lower floor, all of whom do not, however, attend at the same time, part attending till 11 o'clock, and then succeeded by another set, who arrive at that time. On the upper floor there are only fifty pupils, belonging to the fifth and sixth grades. A more equal distribution seems to be desirable. The play-grounds are sufficient, and the privy vaults about eight feet deep, seem to be in good order.

At a considerable distance from these, is the

NORTH EDGEFIELD OR SEARIGHT SCHOOL.

It is a small affair, quite recently established, and, through being misdirected, I failed to find it. Three grades are taught in it by two teachers.

In reference to the Nashville schools, I will only make one remark: that here for the first time, I fell in with the single session system, which, however, prevails throughout the rest of the State, Knoxville and Chattanooga being the only cities I visited in which there is a dinner recess of over an hour between the morning and afternoon sessions. In all the other schools I visited, viz.: those of Nashville, Memphis, Jackson, and Clarksville, a session of five hours continuous study is kept up, with only an intermission of from twenty minutes to half an hour to break its continuity.

I consider the single session so objectionable that, though the matter has been incidentally spoken of in the body of this report, I will recapitulate the main objections to it.

1. *Too great a strain on the undeveloped brain of childhood.*—So much has already been said on this subject that I will only add that the principle has been recognized in most of our public schools as

regards the youngest children. The general rule now is to divide each of the two first grades into two sections, one of which is kept in school till 11 o'clock, at which time the other section arrives and stays till the rest of the school is dismissed. This is now the rule in all the schools of the cities I visited, except those of Clarksville, and there the exception is only in the white schools, the general rule prevailing in the colored schools. So far, it is well: but the little children are not the only ones to whom the single session, with its protracted mental strain, is injurious. I believe it to be so throughout all the classes, but especially so in what are called the high schools, for these are chiefly occupied by young women and girls, who have just attained, or are attaining, the age of puberty. I have already given reasons why long confinement in one posture and protracted mental labor are specially injurious at this age with both sexes, but especially females, and I now reiterate that there is quite as much reason for breaking the five hours of continuous work in their case as in that of the little children.

2. *As affects digestion and nutrition.*—We will suppose the most common arrangement of a session from 8:30 A. M. to 2 P. M., allowing five hours for study and half an hour for recess. Where this is the regulation, the pupils generally pursue one of the three following courses:

(*a.*) They go the whole period from breakfast till school breaks up without eating.

(*b.*) They take their dinner to school with them and eat it during recess.

(*c.*) They take a light luncheon with them and dine after they get home. All these methods are unfavorable to the due nutrition of the body. In the first (*a*), the long fasting weakens the whole body, and with it the brain, while the exhausting work required of that organ occasions a special demand for strength, and therefore for nutrition, which is the only source of its strength. But, besides this, when the child does go to its dinner, one out of two things happens; either he is so hungry that he eats voraciously, too much and too rapidly for good digestion; or, what I have frequently observed, the nervous exhaustion has so far extended to the nerves on which a healthy appetite depends, that the child, though needing nourishment, has a distaste for food—a condition frequently described by a person saying, "I am too hungry to eat."

In the second case (*b*), the child has not time enough to eat healthily; he wants to get out to play; bolts his food; comes into school with it undigested and indigestible, and sits down to his desk with his nervous system attempting to do two things at a time; engaged, that is, in the futile attempt at digestion and mental effort, with the whole system in a condition ill adapted to either.

In the third case (*c*), the luncheon generally consists of trash,

and remaining undigested for the same reason as in the last case, destroys the appetite for dinner without furnishing the nourishment which dinner ought to supply.

I am well aware of the many inconveniences that may be urged against the desired change, but inconveniences shrink to nothing when compared with the pernicious influences of the present system upon the children's health, and I am satisfied that when the attention of parents is adequately directed to the subject, a change will be demanded, whatever the inconvenience, whatever the sacrifice.

Moreover, while the change is making, let it be understood that even the hour allowed at Knoxville, or the hour and a half at Chattanooga, is not enough. Two hours ought to be allowed; half an hour for dinner and an hour and a half for digestion, before mental efforts are renewed.

MEMPHIS.

There is no city in the United States in which so much attention has of late been given to sanitary affairs and so thoroughly as in Memphis; and, even though there are still outlying portions of the city in which the work is incomplete, the public mind has been so thoroughly aroused to the importance of the subject that considerations of hygiene enter into everything that is done. In no department of municipal affairs has public opinion acted more effectually in this direction than in the management of the public schools, which in this respect, with one or two exceptions in the remote suburbs, take the lead among the schools of Tennessee.

SMITH SCHOOL.

Three-story brick building, four rooms on each floor, about 33x27 feet;* the windows well placed for ocular hygiene: walls colored a cool gray; ventilation by flues in the walls, but insufficient without opening the windows; heated by stoves; privies kept clean by a stream of water running through, discharging into the public sewer. Average attendance, about forty pupils to a room. A very satisfactory building.

MERRILL SCHOOL, ON ALABAMA STREET.

A long, one-story frame building, with a passage running through

*The dimensions of rooms here given must not be taken as the result of accurate measurement; they are only approximately true, as estimated by stepping. I can answer, however, for their not being far from the truth.

it longitudinally, having four rooms on each side. [Where sufficient room can be had for it, I consider this disposition of rooms one of the best that can be had.] The rooms are about 27x18 feet each, with and average attendance of thirty pupils in each, or a maximum of forty. The pupils of the first grade are only in school half time—one section in the morning, and another in the afternoon. But, even so, there are too many pupils for the space allowed. The ventilation is excellent, being maintained through an opening in the roof, with which every room communicates. Water communication as before, with city sewerage; large play-grounds.

With the one drawback of overcrowding, this is an unexceptionable building, and it should here be stated that this is a drawback which it shares with every school building in the State.

[The three schools next described are in a poor suburb which at present is outside of the general sanitary operations of the city, and the schools share in the defective sanitation of the district. They were, none of them, originally constructed for school purposes, and are considered as temporary expedients, to be superseded as early as possible by permanent buildings.]

POPE SCHOOL.

A two-story frame building, originally a private residence. The up-stairs rooms are about thirty feet by sixteen feet, ceiling about eight feet high; lower rooms of the same dimensions, with ceiling eight feet high.

The rooms are incapable of good ventilation or lighting; the play-grounds are sufficient; the privies, tubs on the dry earth plan. Two hundred and twenty-five pupils are here taught. The sooner this building is abandoned the better.

CATHARINE STREET SCHOOL—COLORED.

An old church, about fifty feet by thirty feet, frame building. It is divided into two by a canvass (removable) extended longitudinally through the middle; there is a smaller room about seventeen feet by fourteen feet. The attendance is 168, of whom about 100 attend only half the day, making the average present at one time a little over 100. Privies, dry earth tubs. No play-grounds.

WINCHESTER STREET SCHOOL.

Two-story frame building; four rooms, low and narrow, largest room forty-two feet by eighteen feet. Average attendance 188, of which 110 are half-day scholars. Privies have water connection with public sewer. No play-grounds.

JEFFERSON STREET SCHOOL.

This was originally built for a boarding house; it consists of two long, narrow rooms on each floor. The ventilation might be improved at a very small expense, by enabling the windows to be

opened above. Play-grounds very small, practically none. Water connection with city sewers.

MONROE STREET SCHOOL.

A one-story frame building, with ground plan of about sixty-three feet by fifty feet, and a passage running through longitudinally. Two good rooms on each side of the passage, well placed for light and ventilation. Good sized play-grounds. Water connection with sewers. A good building in all respects, but much crowded for room.

LEATH SCHOOL—LINDEN STREET.

A one-story frame building, about one hundred and five feet by fifty feet, with ceiling twelve feet high, and an additional detached building thirty feet by twenty-four feet. Longitudinal passage through main building, which contains eight rooms, each twenty-five feet by twenty-seven feet. Each room has good ventilation through the roof. Play-grounds ample; would be much improved by shade trees all around them. Water connection with sewers.

I think this the best school establishment in Memphis.

KORTRECHT SCHOOL—ON CLAY STREET.

A two-story brick building, exterior dimensions seventy-five feet by sixty-two feet; four rooms on a floor. Average attendance 650. Water connection with sewers. An excellent building, but much overcrowded.

PEABODY SCHOOL—WEBSTER STREET, NEAR MAIN.

A two-story brick, seventy-two feet square outside, with wide passage through and broad staircase. Excellent internal arrangement; ventilators in the wall. Play-grounds of fair size, and surrounding commons sufficiently open to be available for exercise. Beyond city sewers; tubs used with dry earth.

SEVENTH STREET SCHOOL.

A one-story frame building, with two rooms of fair size, temporarily used as a primary school for colored children; not calling for separate description.

CONSPECTUS OF SCHOOLS IN MEMPHIS.

NAME OF SCHOOL.	NO. OF ROOMS.	NO. OF TEACHERS.	NO. OF PUPILS.
Smith School	12	13	466
Leath School	9	9	405
Peabody School	8	9	356
Merrill School	8	8	300
Jefferson School	5	5	200
Pope School	5	5	225
Kortrecht School	8	9	665
Monroe School	4	4	408
Winchester School	4	4	188
Saffarans School	3	3	168
Seventh Street School	2	2	84
	68	71	3,465

Average of pupils to a teacher 48.8.

JACKSON.

The public school system has not long been established in Jackson, and much advance has not been made there, as regards the material accessories of education; indeed, not one of the buildings used there as a school-house was built for that purpose, and only one is owned by the corporation, the rest being rented in various parts of the city.

The site, in its general features, is favorable to hygiene, but there is one element of disease already showing itself, which may be obviated if promptly met by wise sanitary measures; and, as school hygiene depends so largely on topical hygiene, I think its description is not out of place here.

The city is situated on the upper part of the western slope, where the streams begin to take a western course towards the Mississippi. It stands on the lower tertiary formations which, with the cretaceous beds, constitute so wide an area of the western slope. Now, the stratification of these two formations is almost exclusively of this character; it consists of thick banks of red, yellow and white sand, alternating with thin layers of stiff retentive clay. Where the clay is uppermost we have swamps, where the sand is on top we have a dry soil. Jackson is on the sand which, at a considerable depth, has its underlying bed of clay. The rainfall is very rapidly absorbed by the sand, leaving the surface dry, but is arrested at the surface of the clay stratum, where it is reached by boring, and furnishes the water supply of the wells which constitutes the drinking water of the great body of the population. So long as this was in the country

it was a very healthy water supply; it was rain water, filtered through sand, and simply retained in place by the clay stratum. But, when a city came to be built there, all this was changed; now the water, while filtering through the sand, carries down with it all the noxious ingredients which constitute the surface drainage of a city; these accumulate over the clay stratum, from the surface of which the well water is procured, and communicate to it an element of disease which is already making itself felt, and will increase in its power for evil as the city population increases in density. Already it is observed that the drinkers of well water are subject to fevers, from which those who drink from cisterns are exempt.

As this is a report on school hygiene, and not on general hygiene, I will only strongly urge that every school building in Jackson be supplied with a cistern of its own.

I have said that only one building used for public school purposes is owned by the city, and that alone will be described here, for it is useless urging people to spend money in improving property which does not belong to them.

The Long Building.—This was a good sized private residence, of the old-fashioned plan—a two-story brick house, with two wings of one-story each. The body of the house consisted of a central hall, running through the building, with two nearly square rooms on each side of it, and the same plan repeated in the upper floor, except that there is a small additional room now used as a recitation room. Each pair of rooms thus described has been converted into a single room by removing the partition wall between, so that now each story consists of a central passage, with a single, long room on each side of it, adding a small recitation room up-stairs. Besides this, there are the wings, each about twenty feet square, one occupied as superintendent's office, another as a recitation room.

The larger study halls are each forty feet by nineteen and one-half, and about ten feet high up-stairs, and rather more on the ground floor. The windows in these are so disposed as to offer fair average resources for lighting and ventilation with proper attention. The play-grounds are highly satisfactory, large enough for all practical purposes, and the girls' portion abundantly furnished with shade-trees, while the boys' has already been planted with young trees. The privies are kept on the dry earth system, and are cleaned every week.

THE PRIMARY BUILDING.

In the rear of the above, and on the same lot has been erected a one-story frame building. It consists of a study hall and five small recitation rooms, the study hall being a fine, large room seventy-two by twenty-nine feet and fourteen feet high, lighted by windows on both sides; three hundred pupils are taught in it, but not all at

once, the first two grades being divided into sections, which attend half times at different hours of the day. The number of scholars to the main building averages sixty pupils to each study hall.

For reasons already stated, I decline a separate description of the rented buildings; a sound school hygiene would promptly condemn all of them. Prof. Frank M. Smith, the superintendent, a very intelligent and conscientious gentleman, with a mind specially alive to hygienic subjects, does much to abate the evils of unsanitary conditions; but his limitations are very serious, and it is earnestly to be hoped will be shortly corrected. The present arrangements can only be considered provisional.

CLARKSVILLE.

This city has great natural advantages for drainage, and perhaps that is one reason why but little is done towards artificial drainage; only one street has a sewer, and in that the surface drainage and the sewerage both pass off by the same channel, a method not favorable to the efficient disposal of either. The school buildings are neither of them placed within reach of this sewer, and consequently have to depend upon their own resources in that respect.

THE HOWELL SCHOOL BUILDING.

This structure is placed on one of the best sites in the city, being on the summit of one of the four eminences which overlook the rest of its area. It is on a stiff clay soil retentive, of water. The lot has a frontage of 160 feet on the two streets, Franklin and Main, extending 425 feet back from one to the other; it has a considerable slope from front to back.

The building is of brick in three stories, the lower of which is raised three feet from the ground, with a cellar beneath for coal, etc. The height of these is, upper and lower story, fifteen feet, middle story, fourteen feet. The arrangement of rooms on each floor is the same, being very similar to that of the Fogg building in Nashville. It fronts north and south, its entrance front being south. On each story is a principal study hall, thirty-eight by fifty-six feet, facing east, and three recitation rooms facing west, two of which are fourteen by eighteen feet, and two sixteen by eighteen feet. This arrangement, while excellent in all other respects, entails the same disadvantage as it does in the Fogg building, that it necessitates all the windows in the study hall to be placed on one side (the east) so that the room is not sufficiently lighted on its side next to the recitation rooms (the west). The recitation rooms are suffi-

ciently lighted, not extending as far westward as those in the Fogg building. The stair-cases are front and rear, each with its adjacent entrance hall.

The play-grounds are abundantly large, but half of the space fails to be utilized, partly on account of being very rough ground, and partly through the excessively bad arrangement of the privies, which keeps the back grounds constantly deluged with the drainage from them and the urinaries. I am happy to say that in a conference with the city board of education, I urged the necessity of immediate action in this matter, and a committee was appointed to take it in hand with powers of immediate action. The difficulty has been that vaults are forbidden in the city by a municipal enactment, and sewerage is not within reach. I think that a system of tubs or buckets with dry earth and lime will be adopted.

Another matter was presented to the attention of the board, with the concurrence of Prof. Kellog, the superintendent, the expediency of the half time arrangement for little children. Clarksville is now the only city in Tennessee out of the six which I have visited, where the exploded practice is kept up of retaining the primary grades in school through the whole five hours of the school system; all the other schools divide the primary grades into two sections, one of which attends in the morning, the other in the afternoon. I think the half time system will be adopted at the close of the present half session in February, 1885.

COLORED SCHOOL BUILDING.

This also is placed on a large lot on the north side of Franklin street, near the boundary line of the incorporated city. The dimensions of the lot are 167 feet front by 375 feet in depth, giving ample space for all requirements, slanting from the streets downward to the back. The building is of brick, containing two stories and a basement, the elevation as follows: Basement, eight feet six inches; first floor, fourteen feet; second floor, fourteen feet six inches. Each story consists of a stair-hall 10x26 feet, and a school-room 28x43 feet. The basement has a coal cellar under the stair-hall, and a school-room of the same dimensions as those above, except that a small recitation room twelve feet nine inches square, is separated from it. The rooms are well arranged for light and ventilation, but deplorably insufficient in dimensions for the numbers they have to accommodate, as will be manifested on comparing with the dimensions above stated the average attendance of the last month: Upper floor, 118; lower floor, 100; basement, 218 in two consecutive divisions; the number attending at one time, 327; cubic feet, 445.43; cubic feet to each pupil, 136.21.

I have said that the play-grounds are amply sufficient, but the back part of them (like those of the white schools already de-

scribed) is rendered unavailable by the shocking condition of the privies draining toward that part of the lot.

I have computed the cubic feet of space allowed to a scholar in this school as a typical case. It appears to be 136.21, while the hygiene allowance is 400.

Not that this is a solitary case of overcrowding; the exceptions throughout all the State are where the normal proportion between space and numbers is observed. One such exception, and it is a rare one, is found in this same city in the case of the upper room of the Howard building, where the average attendance is seventy-six, and the cubic feet 31920, giving to each scholar a space of 420 cubic feet. But this is only an instance out of many where the interest of the great body of the scholars is sacrificed to that of the higher classes.

Take, for instance, the middle floor of the same building: with less space (for while the area is the same, the room is a foot lower) the average attendance is more than double, being 169, and the ratio of space to a pupil 176 cubic feet; and in the lower floor, occupied by primary classes, the cubic feet being the same as in the third story, the average attendance for the same month was 209, making the average space something under 153.

GENERAL REMARKS.

It would be great injustice to Clarksville if it should be inferred (because I have dwelt specially upon the overcrowding of schools in that city) that its schools are any worse than the average of Tennessee schools.

I am in possession of the figures to show that there is not a school building in Tennessee in which there is not a larger number of scholars taught than the capacity of its buildings justifies on the plainest hygienic principles. I now go further, and contend that not only does the number of scholars transcend the space assigned them, but it is too great for the number of teachers to instruct, consistently with good teaching and mental and bodily health. To provide against misconception in this respect, I will take some figures from my observations in three of the most considerable cities of the State, namely Knoxville, Chattanooga and Memphis.

The proportion of scholars to teachers in these schools may be thus tabulated:

	TEACHERS.	SCHOLARS.	AVERAGE.
Chattanooga	43	2,294	53
Knoxville	48	2,243	47
Memphis	71	3,475	49
Total	162	8,012	49

At first sight, this does not appear a very alarming excess over the number allowed to a teacher by writers on education, who give forty children to a teacher as the maximum ratio; but this does not represent anywhere near the number taught by most of the teachers, for in this respect, also, the high school is pampered at the expense of the lower departments. As many teachers are allowed for the ninth and tenth grades as for the first and second; and I have known a time when, in the schools where I was a member of the Board of Education, there were fifteen pupils all told in the ninth and tenth, while in the first alone there were over seventy.

Now, all the injuries which, in the body of this report, have been mentioned as prejudicial to the health of our public schools, are either created or greatly aggravated by overcrowding. There are too many scholars for the space allowed them, and for the number of teachers assigned them. And what is the remedy? It is obviously a question of money. There are more children in our schools than there is adequate provision made for, either in the way of space or of teachers. More can not be done for them with the funds now available; of that I have seen practical proof. In the Clarksville schools money has constantly had to be advanced by a member of the school board, who is a bank officer. In those of a much larger city, the teachers have, for several months, at this time, remained unpaid. The plainest arithmetic shows them that *there must be either fewer scholars or more money.* The financial question is beyond the scope of this paper to discuss. I can only say that there does not seem to be much disposition on the part of the people to favor an increase of taxation, whether by the State or by municipal bodies. But the second question arises, can the number of children receiving education in the public schools be reduced? I think it can, by judicious retrenchment at both ends.

By the present law of Tennessee, children are admitted at the age of six. I believe that few who have studied the constitution of children, will say that it is good for either their mental or bodily

health, to be turned into the vast crowds which frequent our public schools for the purpose of education. Let them pass their second dentition and acquire that degree of constitutional stamina which follows that process—in other words, let them attain their eighth birth-day at home, picking up such little knowledge of their letters as can be acquired there, and then go to school, even though they will be at first not so advanced as the children who commenced at six. Now, to place the school-age at eight instead of six, would be to cut off the two first grades, which constitute over thirty per cent of the children in school. Now, to consider the other end of the educational scale—the high school. In the schools more immediately under my observation, out of 453 children, the tenth and eleventh grades, which constitute the high school, comprise twenty-one scholars, of whom seventeen are in the ninth grade, and four in the tenth; to put this into an arithmetic statement, less than one-twentieth of the pupils in the school employ more than one-fifth of the teaching force, or each individual of the high school employs four times as much teaching force as a child of the lower classes and that of a higher and more expensive quality. In general terms, it may be said that it costs six times as much to teach a pupil in the high school as one in the lower grades. And I have satisfied myself that about the same ratio prevails in other cities.

But now the inquiry arises, who are the scholars who absorb so disproportioned a share of the school space and school teaching? As regards the boys, the question is soon answered—there are, virtually, none there. In the high school classes, of Clarksville, the tenth grade consists of four girls and no boys; the ninth grade, seventeen in all, has, I know, a preponderance of girls, let us say ten girls and seven boys. I have not the figures before me, but I am certain that the ratio is not far from the truth. It is easy to see why this is the case. The average boy who attends public school has to finish his education at an age varying from twelve to fourteen; after that, he has to go to work and make his living; in other words, he stops at the sixth, seventh, or eighth grade, and the few who make their way into the ninth (in this instance about seven out of 226), are those whose parents' circumstances do not compel them to work for a living, which is good evidence that they can afford to pay for an exceptional education for their children, if they desire one. Leaving out these seven boys then, and we have the whole expense in teaching force and building space of the high school expended in giving fourteen girls a smattering of trigonometry, rhetoric, and the 'ologies.

Of course, this is only the state of things in a moderate sized town, but in higher terms the same ratio prevails everywhere else. Take, for instance, the high school classes who occupy the two upper rooms of the Fogg building, in Nashville, and their numbers are not greater

in proportion to those which swarm the twelve other school buidings, and the ground floor of the Fogg building itself, than our fourteen girls and seven boys to the 433 other white scholars at Clarksville.

Our remedy, then, for the overcrowding, which is now injuring the health of our children, is to raise the school age from six years to eight years, and to abolish the high schools. I know that this will be opposed by many. The other alternative is to double the school tax.

To recount, however, the principle needs of the city schools I have visited, so far as they can be briefly stated, they are:

First: Special means of heating independent of stoves.

Second: Closely associated with this, and mainly dependent on it, special provision for ventilation, independent of windows.

Third: Larger play-grounds, or in defect of these, provisions for gymnastic exercise.

Fourth: A dinner recess of three hours.

Fifth: Smaller number of scholars to a teacher in the primary and grammar schools.

Sixth: Careful provision for the removal of excrement.

Seventh: Above all, MORE SPACE;

And all these things require money.